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CANDIDATE INSECT REPELLENT AI3-36538-GA
1-(CYCLOHEXYLCARBONYL)-4-METHYL PIPERIDINE

ARMY ENVIRONMENTAL HYGIENE AGENCY
ABERDEEN PROVING GROUND, MARYLAND

1976

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TOPICAL HAZARD EVALUATION
OF
CANDIDATE INSECT REPELLENT AI3-36538-Ga
1-(CYCLOHEXYLCARBONYL)-4-METHYL PIPERIDINE
STUDY NUMBER 51-0815-77
OCTOBER 1975 - JULY 1976

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ABERDEEN PROVING GROUND, MD 21010

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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) A hazard evaluation of AI3-36538-Ga was conducted using New Zealand White rabbits for skin and eye studies; Hartley guinea pigs for a skin sensitization study; and Sprague-Dawley, Wistar-derived rats for determination of oral toxicity. It was recommended that AI3-36538-Ga be approved for further testing as a candidate insect repellent.		

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STUDY NUMBER 51-0815-77
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1. AUTHORITY.

a. Letter, US Department of Agriculture, Agricultural Research Service, Southern Region, Insects Affecting Man Research Laboratory, Gainesville, FL, 17 October 1975.

b. Memorandum of Understanding Between the US Department of the Army, Office of The Surgeon General, The US Army Health Services Command, The US Army Environmental Hygiene Agency, the Armed Forces Pest Control Board and the US Department of Agriculture, effective December 1970 with Amendment No. 1, effective August 1974.

2. REFERENCE. Toxicology Division Procedural Guide, US Army Environmental Hygiene Agency (USAEHA), 1972.

3. PURPOSE. The purpose of this study is to provide guidance for further entomological testing of the candidate insect repellent AI3-36538-Ga.

4. SUMMARY OF FINDINGS. A hazard evaluation of the candidate repellent AI3-36538-Ga 1-(cyclohexylcarbonyl)-4-methyl piperidine was conducted by this Agency using New Zealand White rabbits for skin and eye studies, Hartley guinea pigs for a skin sensitization study and Sprague-Dawley, Wistar-derived rats for determination of oral toxicity. A tabular presentation of animal toxicity data developed in this Agency follows:*

* The experiments reported herein were conducted according to the "Guide for the Care and Use of Laboratory Animals," as prepared by the Committee on Revision of the "Guide for Laboratory Animal Facilities and Care," of the Institute of Laboratory Animal Resources, National Research Council (1972)

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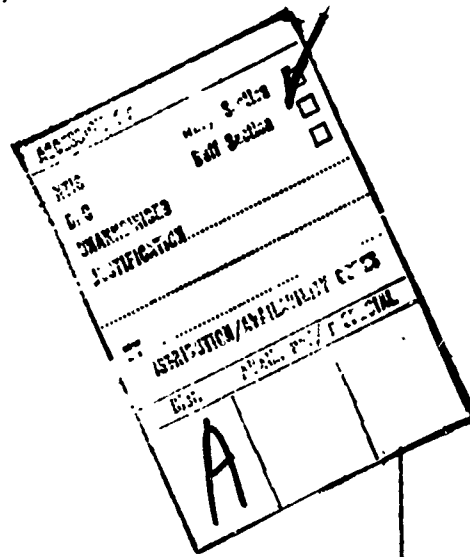
TABULAR PRESENTATION OF DATA

Test	Results	Interpretation
<u>SKIN IRRITATION STUDIES</u>		
<u>Rabbits</u>		
Single 24-hour application to intact and abraded skin of New Zealand White rabbits.	AI3-36538-Ga produced no primary irritation of the intact skin or the skin surrounding an abrasion.	USAEHA Category I (ref Appendix)
0.5 ml technical grade compound applied to each of six rabbits.		
<u>EYE IRRITATION STUDIES</u>		
<u>Rabbits</u>		
Single 24-hour application of 0.1 ml of technical grade compound to one eye of each of six New Zealand White rabbits.	AI3-36538-Ga produced moderate injury to the cornea and, in addition, some injury to the conjunctiva in six of six rabbits at 24-hours after application and for 7 days thereafter.	USAEHA Category E (ref Appendix)
<u>APPROXIMATE LETHAL DOSE (ALD)</u>		
<u>Oral</u>		
Rats (male) - corn oil diluent.	ALD >4926 mg/kg	Presents little lethal hazard from acute accidental ingestion.

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TABULAR PRESENTATION OF DATA

Test	Results	Interpretation
PHOTOCHEMICAL SKIN IRRITATION STUDIES		
<u>Rabbits</u>		
A single application (0.05 ml) of a 25 percent (w/v) solution of the compound (AI3-36538-3a) and of a 10 percent (w/v) oil of Bergamot solution (positive control) in 95 percent ethyl alcohol, were applied to the intact skin of six rabbits. Five minutes after application, the rabbits were exposed to UV light (365 nm) for 30 minutes at a distance of 10-15 cm.	AI3-36538-Ga did not cause a photochemical irritation reaction under test conditions.	Compound AI3-36538-Ga did not cause a photochemical irritation reaction under test condition and is not expected to cause a photochemical irritation in humans.
<u>Control</u>		
Following UV exposure of the rabbits 0.05 ml of the test compound, positive control and diluent were applied to additional skin areas to serve as unirradiated control sites. Application areas were checked for irritation at 24, 48 and 72 hours.	Positive control application and irradiation caused greater irritant effects than in unirradiated areas.	



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TABULAR PRESENTATION OF DATA

Test	Results	Interpretation
<u>SENSITIZATION STUDIES</u>		
<u>Guinea Pigs (Male)</u>		
Intradermal injections of 0.1 ml of a 0.1 percent suspension (w/v) of AI3-36538-Ga or dinitrochlorobenzene (DNCEB)* in a mixture containing 1 volume of propylene glycol and 29 volumes of saline.		
Ten test guinea pigs received and challenged with an 0.1 percent solution of AI3-36538-Ga.	Challenge dose of test compound (last intradermal injection) did not produce a sensitization reaction.	Compound AI3-36538-Ga did not produce a sensitization reaction under these conditions and is not expected to produce a sensitization reaction in man.
Ten positive control guinea pigs received and challenged with 0.1 percent suspension of DNCEB.	Positive control (DNCEB) produced a marked sensitization reaction in ten out of ten guinea pigs.	
Ten cage control guinea pigs; five receiving challenge dose of test compound without prior sensitizing dose; and five receiving challenge dose of DNCEB without prior sensitizing dose.		

*A known skin sensitizer.

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5. CONCLUSION. No primary skin irritation was caused by AI3-36538-Ga either as the technical grade compound or as a 25 percent solution in ethyl alcohol. However, this compound caused moderate damage to the cornea and conjunctiva and should not be allowed to get into the eyes.

6. RECOMMENDATION. Under the provisions of the Memorandum of Understanding (reference paragraph 1b), it is recommended that AI3-36538-Ga 1-(cyclohexylcarbonyl)-4-methyl piperidine be approved for further testing as a candidate insect repellent.



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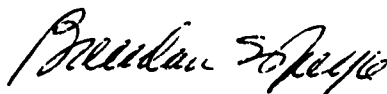


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APPENDIX

TOPICAL HAZARD EVALUATION PROGRAM DEFINITIONS OF CATEGORIES OF COMPOUNDS BEING CONSIDERED FOR ACUTE SKIN APPLICATION

CATEGORY I - Compounds producing no primary irritation of the intact skin or no greater than mild primary irritation of the skin surrounding an abrasion. (INTERPRETATION: No restriction for acute application to the human skin.)

CATEGORY II - Compounds producing mild primary irritation of the intact skin and the skin surrounding an abrasion. (INTERPRETATION: Should be used only on human skin found by examination to have no abrasions or may be used as a clothing impregnant.)

CATEGORY III - Compounds producing moderate primary irritation of the intact skin and the skin surrounding an abrasion. (INTERPRETATION: Should not be used directly on the skin without a prophetic patch test having been conducted on humans to determine irritation potential to human skin. May be used without patch testing, with extreme caution, as clothing impregnants. Compound should be resubmitted in the form and at the intended use concentration so that its irritation potential can be reexamined using other test techniques on animals.)

CATEGORY IV - Compounds producing moderate to severe primary irritation of the intact skin and of the skin surrounding an abrasion and, in addition, producing necrosis, vesiculation and/or eschars. (INTERPRETATION: Should be resubmitted for testing in the form and at the intended use concentration. Upon resubmission, its irritation potential will be reexamined using other test techniques on animals, prior to possible prophetic patch testing in humans, at concentrations which have been shown not to produce primary irritation in animals.)

CATEGORY V - Compounds impossible to classify because of staining of the skin or other masking effects owing to physical properties of the compound. (INTERPRETATION: Not suitable for use on humans.)

EYE CATEGORIES:

A. Compounds noninjurious to the eye. INTERPRETATION: Irritation of human eyes is not expected if the compound should accidentally get into the eyes, provided it is washed out as soon as possible.

B. Compounds producing mild injury to the cornea. INTERPRETATION: Should be used with caution around the eyes.

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C. Compounds producing mild injury to the cornea, and in addition some injury to the conjunctiva. INTERPRETATION: Should be used with caution around the eyes and mucosa.

D. Compounds producing moderate injury to the cornea. INTERPRETATION: Should be used with extreme caution around the eyes.

E. Compounds producing moderate injury to the cornea, and in addition producing some injury to the conjunctiva. INTERPRETATION: Should be used with extreme caution around the eyes and mucosa.

F. Compounds producing severe injury to the cornea and to the conjunctiva. INTERPRETATION: Should be used with extreme caution. It is recommended that use be restricted to areas other than the face.